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THE PLANT DISEASE REPORTER

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THE PLANT DISEASE SURVEY

DIVISION OF MYCOLOGY AND DISEASE SURVEY

Vol. XV December 1, 1931 Number 14

DISEASES CAUSED BY NEMATODES

STRAWBERRY "DWARF" IN CALIFORNIA

By Harold E. Thomas and George M. Darrow

During a recent survey of cultural methods and plant diseases of the strawberry in California, cases of "dwarf" caused by the bud or crown nema, Aphelenchus fragariae, were observed. The presence of the causal nema in specimens sent to Washington, D. C., has been determined by Dr. G. Steiner. This is believed to be the first report of the "dwarf" disease in this State. Infected fields indicated that the disease was brought to California on plants from other States and that the nema might persist in the diseased plants and in runners from diseased plants during the life of the planting.

No dwarf was observed in plants of Marshall, (Banner, Oregon), Nick Ohmer, Capitola, or Missionary varieties. Dwarf was found most commonly in fields in southern California where the Klondike is the chief variety grown and the plants of which are introduced from eastern States. The disease is especially common in the Los Angeles district. It was found in the following counties: Los Angeles, Orange, Riverside, San Bernardino, San Diego, Imperial, and San Mateo.

The symptoms of the disease are the same as those produced in the eastern States and are not easily confused with the symptoms of other troubles except those caused by the "strawberry" or "cyclamen" mite.

The highest amount of dwarf found was 16 per cent in a field of Klondikes set this year with stock from Tennessee. The stock for other fields with usually a lower percentage of dwarf came from Arkansas. Fields set two or three years showed a low percentage of dwarf, in part because the dwarf plants died or were rogued out, in part because they made fewer runners, and in part because the fields consist of raised beds. Rains apparently tend to wash the nemas out of affected plants on raised beds but not into healthy plants. Irrigation practice rarely raises the water high enough to spread the trouble except where runners are allowed to root in the ditch bottoms.

In two fields, one near Palo Alto and the other near Santa Ana, dwarf was found in the Blakemore variety but the infection was slight, being much less than one per cent. Other fields of this variety showed no trace of the trouble.

Though there was evident loss due to dwarf, it was relatively insignificant considering the State as a whole.

ROOT KNOT IN ARIZONA

WASHINGTON PALM (Neowashingtonia): On two trees in Tucson, one dead and the other in a dying condition. Small lateral roots killed. (Oct. 25).

GRAPE: Thompson Seedless vine at Globe produced a crop three years ago but none since. Examination of roots disclosed abundant root knot (Caconema radicicola). (Oct. 23, J. G. Brown)

DISEASES OF FRUIT CROPS

STRAWBERRY DISEASES IN NORTH CAROLINA IN 1931

G. A. Meckstroth has sent in the following report on the occurrence of strawberry diseases in North Carolina in 1931:

North Carolina strawberry shipments exceed those in 1930 by about 50 per cent. The yield and quality were unusually good. The cold weather which prevailed during the greater part of last winter continued until early in April, and was probably responsible for the fact that there was practically no winter blossoming; this delayed ripening a few days, but resulted in a big crop of early berries when the warm weather set in. High prices prevailed throughout the season. Weather conditions during the picking season were ideal for the production of berries of good quality in the Chadbourn district. In the Wallace-Rose Hill district heavy rains fell which injured the quality and condition of the berries somewhat.

Weather conditions during the picking season were unfavorable for the production of fruit rots, and in general, it may be said that losses due to disease were slight. A brief summary follows.

Leaf Spots.

Leaf spot (Mycosphaerella fragariae): Infection general, but injury very slight.

Scorch (Diplocarpon earliana): Infection general, but injury very slight; most abundant after the close of the picking season. Typical spots were found on the fruit calyxes, and examination revealed the presence of the spores of the causal fungus. It probably does more damage to calyxes than to the leaves, since the dead calyxes injure the quality and appearance of the berries considerably.

Fruit Rots.

The loss from fruit rots has been very slight. No counts were made at packing sheds, but the Botrytis rot was more common than any of the other rots.

Dwarf (Aphelenchus fragariae):

Widely scattered throughout the strawberry section. No exact data available as to loss caused by it, but the yield is doubtless reduced somewhat. The symptoms did not appear in the field until the first week in June.

Other observations and notes:

There has been considerable dying out of plants during the late summer and fall, but much of this is due to dry weather; root aphids are probably also a contributory factor. During August the rainfall at Chadbourn amounted to 7.29 inches, most of which fell during the first half of the month. Only 1.66 inches fell in September, .59 inch in October, and none in November to date (Nov. 13). In many fields the stand has been much reduced, and conditions have been unfavorable for the production of runner plants. There is a great reduction in the number of runner plants, and many of these are not rooted on account of the dryness of the soil; this will undoubtedly result in a local shortage of plants for starting new plantings. The root-knot nematode (Caconema radicicola) has been found in a few cases, but the damage caused by it is undoubtedly small. None of the growers practice spraying, as far as the writer is aware.

VERTICILLIUM WILT OF RASPBERRIES IN PENNSYLVANIA

The occurence of Verticillium wilt of raspberries in Pennsylvania is reported by H. W. Thurston, Jr., as follows:

"Verticillium wilt has been found on raspberries in Erie County. So far as I am aware, Verticillium has not previously been reported on raspberries in this State. Mr. J. K. Thornton of the State Department of Agriculture at Harrisburg, who was making his final field inspections for the certification of raspberries, sent me several specimens from one of the plantings in Erie County and I succeeded in culturing Verticillium from them. We have no information at the present time as to how extensive this disease may be, but inasmuch as it is known to be present in both New York State and Ohio, I presume that it can be found in many more Pennsylvania plantings in the Lake Erie region".

(November 11, 1931).

APPLE DISEASES IN MONTANA

Scab (Venturia inaequalis): Practically no commercial injury by scab in the Bitterroot and Flathead districts. Few growers sprayed to control it. Scab was controlled by drouth. Commercial MacIntosh apple orchards are concerned.

Drought spot (physiological): Drought spot was unusually abundant in commercial orchards of MacIntosh apples in western Montana last summer.

TOBACCO DISEASE SURVEY

MASSACHUSETTS

W. H. Davis

A second tobacco disease survey was made in 1931 and the methods followed were similar to those of 1930. However, an endeavor was made to inspect the seedbeds of more growers who cultivated small acreages since their seedbeds were suspected of being centers of greatest wildfire dissemination. Furthermore, special effort was made to distribute the inspection of seedbeds so that the whole tobacco growing area in Massachusetts would be represented. As a result fifty-two inspections were planned and completed.

The weather: Most growers agreed that an early period of warm weather advanced the setting season about two weeks. Transplanting began as early as May 20 and continued until June 20 when the latest seedlings which had been grown under cloth were transplanted. There was an abundance of rainfall which, with other factors, was very injurious to poorly drained seedbeds and those located on low ground. As the season advanced there was an abundance of clear, hot, humid weather and the rainfall was sufficient even for the tobacco which had been planted on sandy and gravely soils. Most of the growers who were consulted believed that the weather this season was ideal for tobacco culture while a few believed the temperature too hot, especially that following the cool rains. Only one complaint was registered concerning too scant rainfall and that from a grower who had planted on gravely soil in a field which was partially surrounded by high hills and had not been visited by the local showers.

The seedbed survey

Sash: The seedbeds inspected were covered by 4,068 sash. However, two growers used cloth but stated that the correct mesh of cloth could not be procured and that plants grown in cloth-covered seedbeds were too tardy in development. Yet, the 1931 crop planted from these seedbeds matured and proved to be especially good tobacco even if some of it was not harvested until September 20.

Seed: Ninety per cent of the growers produced their own tobacco seed. Only four growers had their tobacco seed cleaned by blowing but each believed it was worth while. However, this does not represent the general practice as a good number of growers in the State have seed cleaned at the College. None reported seed treatment. One said that he sowed seed which had remained covered in a glass Mason jar for 11 years and a good tobacco crop was grown from it; three used seed two years old but ninety per cent used seed one year old.

Seedbed: As a rule, growers cultivating less than eight acres did not sterilize the seedbed soil. Five reported sterilizing with steam; five with formaldehyde; one with waste wood alcohol removed from his auto radiator.

Spraying and dusting: Only one-fifth (10) of the seedbeds inspected were either sprayed or dusted. Two used liquid Bordeaux and the others applied dusts as "arsenate", copper carbonate and Bordeaux.

Diseases: Damping-off was the most prevalent seedbed disease observed. This disease was probably favored by the wet weather. The losses varied from 40 per cent in some seedbeds to a trace in others. Cultures made from these diseased seedlings showed: Rhizoctonia, Pythium, Fusarium and other fungi present in the diseased stems.

Wildfire (Bacterium tabacum) was located in three seedbeds. A third inspection was made of one seedbed before the disease was definitely recognized and this was on the first day that the grower started pulling plants for transplanting. However, the plants in the whole seedbed were immediately destroyed by order of the owner.

Special efforts were made to detect mosaic which we find so difficult to distinguish in tobacco seedbeds. The disease was observed in nine seedbeds judging from the follow-up observations taken in the field. In each of these seedbeds, the plants were exceptionally large for setting and in three seedbeds, the first pulling had been made. One grower pulled plants from a seedbed in which mosaic had been called to his attention and 90 per cent of his field plants showed mosaic. Furthermore, in August, 99 per cent of the plants allowed to mature in this grower's seedbed were infected with mosaic. In another case, plants were pulled from a seedbed thought to show mosaic and used for resetting. Nearly all the resets bore mosaic and were rogued. Another grower pulled sets from an inspected seedbed which was believed to have mosaic. These sets were used to plant a triangular area

of one-half acre which was the remainder of a large tobacco field. In August, 90 per cent of the plants in this field showed mosaic and were so "rusted" that the grower was forced to harvest two weeks too early.

Only five growers gave any special attention to the use of tobacco when the seedlings were being pulled. Cigarette smoking by the proprietor and by workmen who were pulling seedlings was often observed during the inspection of seedbeds.

Thielavia root-rot (T. basicola) was located in three seedbeds. Potash hunger was also noted in three seedbeds; one had received no fertilizer at all but the other had received one application of some "old" fertilizer. However, nearly all the growers fertilized the seedlings sufficiently since they can readily distinguish the symptoms of potash hunger. One case of root-burn caused by an excessive application of nitrate of soda was noted.

In 1930 considerable sashburn was reported but in 1931, only four seedbeds showed sashburn. Thus, more attention had been given to ventilating the seedbeds.

Many of the growers appreciated the information which this seedbed inspection brought to them and requested another inspection of their 1932 seedbeds.

The Field Survey.

From the seedbeds inspected, over 724 acres of tobacco were planted. Excluding the acreage cultivated by the largest growers, the plantations averaged about 10 acres. Some extra inspections were made by request and where interesting reports were gathered concerning conditions on adjoining plantations.

Hail and Wind: It was estimated that hail and wind wrought over a half million dollars of damage to the Massachusetts tobacco crop in 1931.

On June 13, a high wind blew down many tobacco tents and 20 per cent of 50 acres of shade tobacco in the Westfield district had to be "lifted" and "braced" with soil.

Two severe storms which occurred on July 23-24 damaged tobacco in the Connecticut River Valley, including Massachusetts and Connecticut. The total damage was estimated at $3,000,000 while in Hampshire County, Massachusetts, the loss was set at $500,000. This was in the Laurel Park, Hatfield and Whately regions. The other storms took their toll in Connecticut and near the border in Massachusetts.

On August 17, hail and wind injured tobacco in the Montague district and the loss was estimated at $50,000.

Six of the inspected plantations received hail injury varying from 50 to 100 per cent loss. The wind injury varied from a trace to 20 per cent where 90 per cent of the plants bore one or more leaves with "broken backs".

Diseases:

Angular leaf spot (Bact. angulatum) appeared later in 1931 than in 1930. Last year, it was located in June and prevalent after July 20; this year, it was not definitely seen until July and became prevalent after August 15. During the inspection, it was found in most of the fields but apparently did very little injury.

Mosaic was observed in each plantation inspected. The plants infected varied from one to 98 per cent of the crop and the estimated loss from a trace to 40 per cent. The comparatively small loss in highly infected fields was believed to be due to weather conditions favorable for plant growth. Mosaic was generally conceded to be the most prevalent tobacco disease of 1931. Often seed plants left to mature in the fields were highly infected.

Wildfire was found on four plantations. Diseased plants were scattered and difficult to locate in the fields. Furthermore, growers said that they had never seen this disease so "scarce". Yet, this condition could be expected since few if any growers transplanted from infected seedbeds and the season was especially favorable for plant growth.

About August 15, a leaf spot of unknown cause was observed on the lower leaves of both mosaic and apparently healthy plants growing in the field. These spots were circular in outline with diameters varying from a fraction of a millimeter to 5 m.m. However, they often coalesced and covered large areas of the leaf. The centers were brown and often bore minute, dark, concentric rings suggesting targeting. By aid of a microscope in the laboratory, no parasitic bacterial or fungous organism could be logically associated with these spots so specimens were sent to Dr. James Johnson for further investigation. In one lot collected from the lower leaves of plants, he detected the presence of the wildfire organism and mosaic. In another lot collected from the upper leaves of plants apparently lately infected, he reported the presence of what seemed to be non-pathogenic bacteria. From August 20 to August 30, these spots appeared to increase in number and were mostly confined to the upper leaves but

some fields appeared as if a general infection of the plants had occurred. Workmen in one field had observed this leaf spot and stated that this disease scattered rapidly after topping and after warm weather following warm rains.

Plants showing "albinism" which Schaffnit believes a genetic character rather than a type of mosaic were observed in 7 fields.

OHIO

A. L. Pierstorff

Twenty-three men sterilized their seedbeds with steam, while 19 used the burning method. These different methods are employed in different sections of the State and seldom do we find a man in the Darke tobacco area burning his seedbed. It is equally rare to find a man in the Burley tobacco area who has steamed his bed.

Only 9 per cent of the men sprayed their plants in the seedbed. Three-fourths of the men used their own seed, while approximately one-fourth purchased seed from an outside source. Less than one-third of the men cleaned their tobacco seed. Practically all of the men who cleaned their seed are located in the Darke tobacco area near Germantown, where the Experiment Station has a mill for cleaning tobacco seed. Only three men treated their tobacco seed.

The crops which preceded tobacco show a great variation. Six men followed tobacco with tobacco, while six followed clover with tobacco. Pasture was next frequent, with four men. Other crops follow in the order given: Oats, corn and wheat, three each; blue grass, two, weeds, two; blue grass and weeds, two each and the remainder used either sweet clover, alfalfa, potatoes, sweet corn and miscellaneous crops. Practically 80 per cent of the men used commercial fertilizer. One-fourth of them used manure in addition. A 4-10-6 analysis was the most prevalent, while a 3-13-1 analysis would represent a composite for the entire group. The amounts used varied from 800 to 125 pounds per acre with an average of 353 pounds.

Sixty per cent of the fields showed mosaic with an approximate loss of 1.2 per cent and 9.5 per cent of the fields showed ring spot. The loss was not significant. Only one field showed wild fire. Angular leaf spot was present in 78 per cent of the fields. Losses from leaf spot would average around 7 per cent. Black fire was found in 31 fields with a loss of 4.6 per cent.

A trace of the following diseases was found in one or more fields: Brown root rot, frenching, fusarium wilt, vein banding, etch and coarse etch. Also, one field was found which was severely attacked by broom rape, the species Orobanche ludoviciana. The loss in this field was confined to that portion which had been formerly flooded by the Ohio River. Another field similarly infected was about one mile distant from the one reported. This was later called to my attention through correspondence with the county agent. Old tobacco growers in this area had never seen a case of broom rape; although a tobacco bulletin written in Ohio in 1904 mentions broom rape and gives some excellent pictures of it.

INDIANA

R. W. Samson

A field survey for tobacco diseases was made on July 27, 28, and 29, 1931, in Bartholomew, Jackson and Spencer counties. About seventy-three acres were covered, representing twenty-six different plantings and between fifteen and eighteen different growers.

In general, conditions were much more favorable for tobacco growing in the sections surveyed this year than they were during the 1930 season. This was particularly true in Jackson and Bartholomew counties, where the rainfall had been fairly adequate. In Spencer County most fields were suffering severely from drought, though not to the extent that they did during the 1930 season. This section received considerable rain shortly after the survey was made so that the crop no doubt improved.

Drought injury, mosaic, ringspot, frenching and Fusarium wilt were the diseases found to be causing damage in the sections visited. The loss from dry weather in Spencer probably can be estimated at 10 per cent.

Mosaic was found in practically all fields affecting from a trace to 25 per cent of the plants. Mostly the percentage of infection was less than 5 and little damage was being done.

Ringspot was found in low percentage in less than half of the fields. It was responsible for a small but definite amount of damage.

Frenching was noted in five fields, in two of which approximately five per cent of the plants were affected. One of these fields had been in clover for the two years previous and had been limed before sowing to clover. The other field had been in alfalfa for some years and also had been limed.

Fusarium wilt was found in three fields in Spencer County, in one of which at least 2 per cent of the plants had been killed by the disease. Only very obviously diseased plants were noted and it is quite possible that a survey made two or three weeks later would have revealed considerably more of the disease.

TOBACCO DISEASES IN CANADA 1931

Compiled by: T. G. Major

Seedbed

Damping-off (Pythium de Baryanum). A few cases were reported around Tillsonburg, Ontario. In the Northern District of Quebec many beds were almost completely destroyed. Some damage also occurred in the Southern District.

Black root-rot (Thielavia basicola). Numerous cases were found in the L'Assomption-Montcalm region and an occasional instance in the Old Belt of Ontario.

Seedbed Mould (Pyronema confluens). Several cases occurred in Colchester South township, Essex County, Ontario. Formaldehyde (1:1000) checked the fungus but Uspulun was not effective. Ventilation appeared to be an important factor.

Brown root-rot (Cause unknown). The majority of the plants in the Summerland (British Columbia) Station beds were affected. The roots were brown in colour and root development was insufficient to sustain the plants without wilting.

Sunburn. Considerable damage was reported in the Northern District of Quebec.

Field

Black root-rot (Thielavia basicola). In Ontario moisture conditions were favourable to the disease but high temperatures kept it in check. Many of the fields in the Burley sections showing early season infestations recovered to a considerable extent. Much less damage occurred in Quebec, again due to the warm weather.

Brown root-rot (Cause unknown). A few cases occurred in Quebec in fields where the tobacco had been preceded by timothy. In Ontario flue-cured tobacco grown after a 'rest crop' of fall rye showed an uneven stand in some localities.

Wildfire (Bacterium tabacum). No cases were reported in 1931, in the commercial districts. A few plants were affected at the Central Experimental Farm. The infestation was traced to a sample of seed of Nicotiana affinis.

Angular Leaf-spot (Bacterium angulatum). Minor outbreaks were reported on late crops in both Ontario and Quebec.

Mosaic (Virus). The trouble was less prevalent in Quebec than in past years. In Ontario, particularly in the Old Belt, many severe outbreaks were reported, some fields having infestations ranging up to 75 per cent. The priming varieties, Cash and White Stem Orinoco, appeared to be most seriously affected. In British Columbia 48 per cent of the flue crop contained approximately 2 per cent affected plants. In the case of Burley the infestation was about 1 per cent.

Frenching. Considerable damage in the New Belt of Ontario and in British Columbia.

Curly Dwarf (Cause unknown). Slight injury in the Okanagan Valley, British Columbia.

Physiological leaf spots. In Ontario heavy local showers were followed by a breaking down of the leaf tissues.

Nitrogen starvation. A premature yellowing of Burley occurred on the lighter soils in the Old Belt of Ontario where less than 500 pounds per acre of low-analysis fertilizers were applied.

Lightning injury. One case was reported in Maidstone Township, Essex, Ontario.

Hail injury. Some 700 acres were damaged in Norfolk County, Ontario, of which 200 acres were a total loss. In Essex and Kent approximately 300 acres were affected.

Fertilizer injury. In Ontario heavy applications of highly concentrated fertilizers not sufficiently mixed with the soil resulted in a stunted growth.

Wind damage. Considerable loss in the Ontario districts late in August.

Curing Barns

Pole burn. Slight damage was reported in some localities in Ontario.

DISEASES OF TREES

TREE DISEASES IN MASSACHUSETTS

The following note by C. C. Perry is quoted from the Blister Rust News for October, 1931, Pages 252-253.

> "We have to record an unusually serious outbreak of the willow scab in western Massachusetts. Evidently the excess of rainfall during the summer months, coupled with the prevalence of high temperatures throughout the season, had its effect in increasing the spread of this fatal tree disease with disastrous results to our willow-lined highways of the Berkshires. The same climatic conditions were also very favorable for the development of the rust or leaf blotch on the common horse-chestnut. This disease is not unusual with us, of course, but seldom if ever has it been as widespread or so damaging to the foliage as during 1931. In the early summer, the rust which attacks our native ash and alternates on certain marsh grasses, was rather spectacular in its attack on roadside ash trees along a part of our coastline, especially in the towns of Newburyport and West Newbury in Essex County. This outbreak, however, was entirely local." (Sept. 18).

WILLOW SCAB (FUSICLADIUM SALICIPERDUM) IN MASSACHUSETTS

An additional report on willow scab is given by G. S. Moore, also in the October issue of the Blister Rust News, Page 2/4.

> "In western Massachusetts, especially in Berkshire County, the willow scab has been once again evident, this time to a rather alarming extent. It is usually prevalent along the main highways as one passes through the broad meadows which are so characteristic of the southern part of the county. In many sections the willows border the road, sometimes for long distances and to have these trees die or even to have the leaves completely browned is a serious drawback to the otherwise beautiful section of the Berkshire Hills, the natural beauty of which is well known to all who have ever been fortunate enough to visit that section of Massachusetts. The scab or blight, as it is sometimes called, is more general and its destructiveness seems complete at this time insofar as the foliage is concerned. Previous attacks by this disease have left here and there stark evidence of what we may expect from the attack this season."
>
> (Sept. 3).

MISCELLANEOUS OBSERVATIONS

CYTOSPORA SACCHARI ON SUGARCANE IN LOUISIANA

Ernest V. Abbott, of the U. S. Sugar Plant Field Station at Houma, Louisiana, transmits the following note:

> "Cytospora sacchari Butler has been found rather commonly on sugarcane in Louisiana during the past season. What is believed to be the first collection of the disease in the United States was made at Houma, La., by Mr. Eaton M. Summers, October 3, 1930, on the variety Co. 281. Only scattered cases of infection were noted last year, but during 1931 it has been found on all of the commercial varieties in plantation fields. However, it is of little or no economic importance.

"Certain of the C.P.H. series of seedlings appear to be particularly susceptible, notably C. P. H. 153, of which stalks injured by the sugarcane moth borer, as well as leaf sheathes, have been found affected."

BACTERIAL WILT OF ALFALFA IN SOUTH DAKOTA

Earnest A. Walker reports the occurrence of bacterial wilt of alfalfa in South Dakota, as follows:

"The bacterial wilt disease of alfalfa (Aplanobacter insidiosum) has been seen in the experimental plots of alfalfa at the State College Station. These were found by Dr. S. Cecil Salmon now Principal Agronomist in wheat investigations, Division of Cereal Crops and Diseases, U. S. Department of Agriculture, during his visit to South Dakota in July of this year. Since this finding I have seen several diseased specimens from this part of the State."

(Oct. 31.)

M A R K E T P A T H O L O G Y

NEW YORK MARKET PATHOLOGY NOTES

C. O. Bratley

CALIFORNIA VALENCIA ORANGES: The late Valencia oranges shown more pitting and spotting than those arriving earlier in the season. Isolations from the spots have shown that most of them contained either Alternaria sp. or Colletotrichum sp. The transfers from some of the smaller light tan spots remained sterile.

MALAGA GRAPES FROM CALIFORNIA: Several cars examined lately showed high percentages of moldy stems. Botrytis sp. was the most prominent fungus although some Alternaria sp. was found in most bunches.

SOUTH CAROLINA SWEETPOTATOES: Twenty-five per cent of the sweetpotatoes in a car shipped in bulk were affected with soft rot (Rhizopus nigricans.) About 3 per cent of the potatoes contained black rot (Ceratostomella fimbriata.)

ITALIAN CHESTNUTS: A shipment was examined which contained a high per cent of moldy nuts, some of which were decayed internally. Penicillium sp. was very prevalent. Aspergillus sp. and Mucor sp. were found to a lesser extent.

BOSC PEARS FROM OREGON: Bosc pears from Oregon are arriving on the New York market in excellent condition. Practically all cars contain less than 1/2 per cent blue mold rot (Penicillium sp.)